

HSRL for Aerosols, Winds, and Clouds using Optical Autocovariance Wind Lidar (HAWC-OAWL)

Completed Technology Project (2014 - 2017)



Project Introduction

The High Spectral Resolution Lidar (HSRL) for Aerosols Winds and Clouds using the Optical Autocovariance Wind Lidar (HAWC-OAWL) is designed to provide co-located and simultaneous measurements of wind and aerosol properties with a focus on the study of how aerosols and winds affect cloud radiative forcing. Under this IIP, Ball Aerospace will enhance the OAWL system science measurements in the following ways: provide additional aerosol characterization information by adding 1064 nm wavelength backscatter and depolarization to the existing 532 nm and 355 nm channels; enable retrievals of horizontal wind speed and direction profiles by integrating two high TRL-telescopes with perpendicular line-of-sight (LOS) perspectives on the wind fields; increase data coverage by adding a wavelength/polarization multiplexing system to make measurements along the two LOS perspectives, simultaneously, with one wavelength per view; increase TRL and improve data precision and throughput through the design and build of low-noise detector electronics and a robust path-to-space data acquisition system with real-time processing of wind and aerosol products; and package and qualify the system for ground and for flexible NASA aircraft operation with frame and housing that provide structural and thermal independence from widely varying aircraft environments. The system will be validated in a co-located ground-based validation of the HAWC-OAWL system against an existing HSRL after which we will work with the HAWC science team to demonstrate the impact that combined wind/aerosol data products can have on future atmospheric science campaigns. The HAWC-OAWL IIP is a three year period of performance, with a flexible start date of March 2014. The entry Technology Readiness Level for the overall HAWC system is TRL3 and the exit is expected to be TRL5.

- Develop a rugged wind and high spectral resolution aerosol lidar to measure aerosol transport, and aerosol, wind, and cloud interactions
- Demonstrate HAWC-OAWL wind and aerosol measurements in airborne flight tests
- Validate HAWC aerosol measurements and develop new aerosol and wind data products



ALHAT - ETD Autonomous Landing & Hazard Avoidance
Tech Earth Science Technology Office

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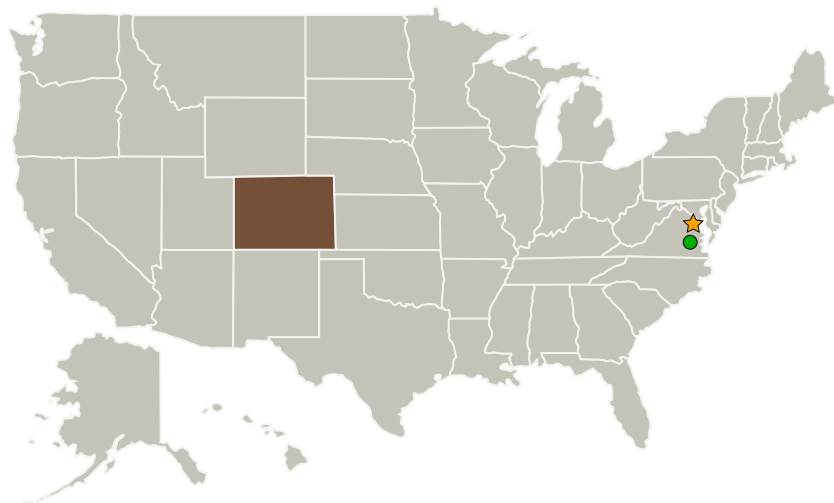
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Primary U.S. Work Locations and Key Partners



Organizations Performing Work	Role	Type	Location
★ NASA Headquarters(HQ)	Lead Organization	NASA Center	Washington, District of Columbia
Ball Aerospace & Technologies Corporation	Supporting Organization	Industry	Boulder, Colorado
● Langley Research Center(LaRC)	Supporting Organization	NASA Center	Hampton, Virginia

Primary U.S. Work Locations

Colorado

Organizational Responsibility

Responsible Mission Directorate:

Science Mission Directorate (SMD)

Lead Center / Facility:

NASA Headquarters (HQ)

Responsible Program:

Instrument Incubator

Project Management

Program Director:

Pamela S Millar

Program Manager:

Parminder S Ghuman

Principal Investigator:

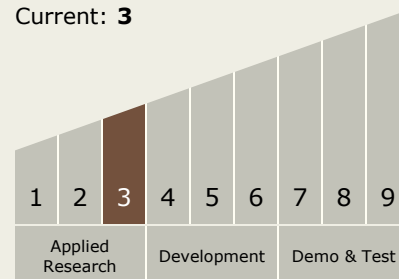
Sara Tucker

Co-Investigator:

Vicki Piers

Technology Maturity (TRL)

Start: 3
Current: 3



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Images



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(<https://techport.nasa.gov/image/5130>)

Technology Areas

Primary:

- TX08 Sensors and Instruments
 - └ TX08.1 Remote Sensing Instruments/Sensors
 - └ TX08.1.5 Lasers

Target Destination

Earth